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New species of *Pronectria*, *Vouauxiomyces*, *Wentiomyces* and *Zwackhiomyces* from Australasia

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ABSTRACT

Four new lichenicolous fungi (*Pronectria streimannii* from *Sticta cyphellulata* from Australasia, *Vouauxiomyces brattii* from *Pseudocyphellaria faveolata* from Tasmania, *Wentiomyces tatjanae* from *Pseudocyphellaria coronata* from Tasmania, New Zealand and Papua New Guinea, and *Zwackhiomyces kantvilasii* from *Parmotrema chinense* from Tasmania) are described and illustrated, and their differences from related taxa are discussed.

Introduction

During the study of lichenicolous fungi associated with *Pseudocyphellaria*, *Sticta* and *Lobaria* (Kondratyuk *et al.*, 1994; Kondratyuk & Galloway, 1995; Coppins & Kondratyuk, 1995), a number of new taxa have been found, four of which are described here. Further studies are in progress and will be reported elsewhere.

Taxonomy

1. *Pronectria streimannii* Kondratyuk, Coppins & D.J.Galloway *sp.nov.*

Fungus lichenicola. Perithecia immersa sed erumpescentia, dispersa, obpyriformia vel papillata, aurantiaco-rubra, 270-300(-350) x 300-350 µm. Asci cylindrici, 80-100 x 0-12 µm, 8-spori. Ascosporae cylindriceae, hyalinae vel brunneae, 1-septatae, ornamentatae tuberculis hyalinis 1.0-2.0 µm latis, (10.0-)12.7-16.2 x (7.0-)8.1-10.1 µm.

TYPUS: Queensland: Barron State Forest, Herberton Range, 11 km SSW of Atherton. 7°22'S, 145°36'E, 1050 m, rain forest, logged in the past. On treelet stem. On *Sticta cyphellulata* (Müll.Arg.) Hue, 2 Mar. 1983, *H. Streimann 27294* (CBG 830 4195).

Lichenicolous fungus, parasymbiotic on the thallus of *Sticta cyphellulata*, producing pale pinkish, rosaceous, orangish to slightly orange-brownish and reddish-violet ascomata. *Ascomata* perithecioid, immersed, developed in medium layer of the host thallus and very characteristically damaged upper cortex of the thallus of the host, single or appearing aggregated, obpyriform and conspicuously ostiolate, 270-300(-350) µm diam. and up to 300-350 µm high, near ostiole about 80 µm thick and 100-130 µm high; wall equal in thickness or somewhat broader in the vicinity of ostiole, prosenchymatous, composed of 3-6 layers of polyangular cells; outer layers of cells reddish-brown, cells 6.7-10.5(-12.2) x 2.2-7.8 (-8.9) µm, with more or less thickened walls; inner layers less intensely pigmented to hyaline and thin-walled cells, 7.8-13 x 1.1-2.2 µm. *Paraphyses* absent. *Asci* arising from the base of the ascomatal cavity, cylindrical, 80-100 x 10-12 µm, 8-spored. *Ascospores* monostichously arranged in the asci, remaining in these lines after release from the asci, ellipsoid with rounded apices when young, soon becoming more or less cylindrical, olivaceous brown before release from the asci, walls rather thick, well developed (and easily visible in the light microscope), verruculose (with warts 1.0-2.0 µm diam.), (10-)12.7-16.2 x (7.0-)8.1-10.1 µm. (Fig. 1 a-d, 2 a-d, 6 c)

NOTES

With its large perithecia and rather wide and verruculosely ornamentated ascospores, *P. streimannii* resembles the Icelandic species *P. ornamentata* (D.Hawksw.) Lowen, known from *Peltigera* thalli (Hawksworth, 1982), and the Tasmanian species *Polycoccum jamesii* D.Hawksw., known from *Psoromidium versicolor* (J.D.Hooker & Taylor) D.J.Galloway (Hawksworth & Diederich 1988). *Pronectria ornamentata* differs from the new species by its non-papillate perithecia, 4-spored asci, and by its ascospores which are elongate-ellipsoid, rounded at the apices, and much longer (19-)25-31(-33) x 7-9(10) µm. *P. streimannii* differs from *Polycoccum jamesii* by its pale pinkish, rosaceous, orangish to slightly orange-brownish and reddish-violet ascomata which do not

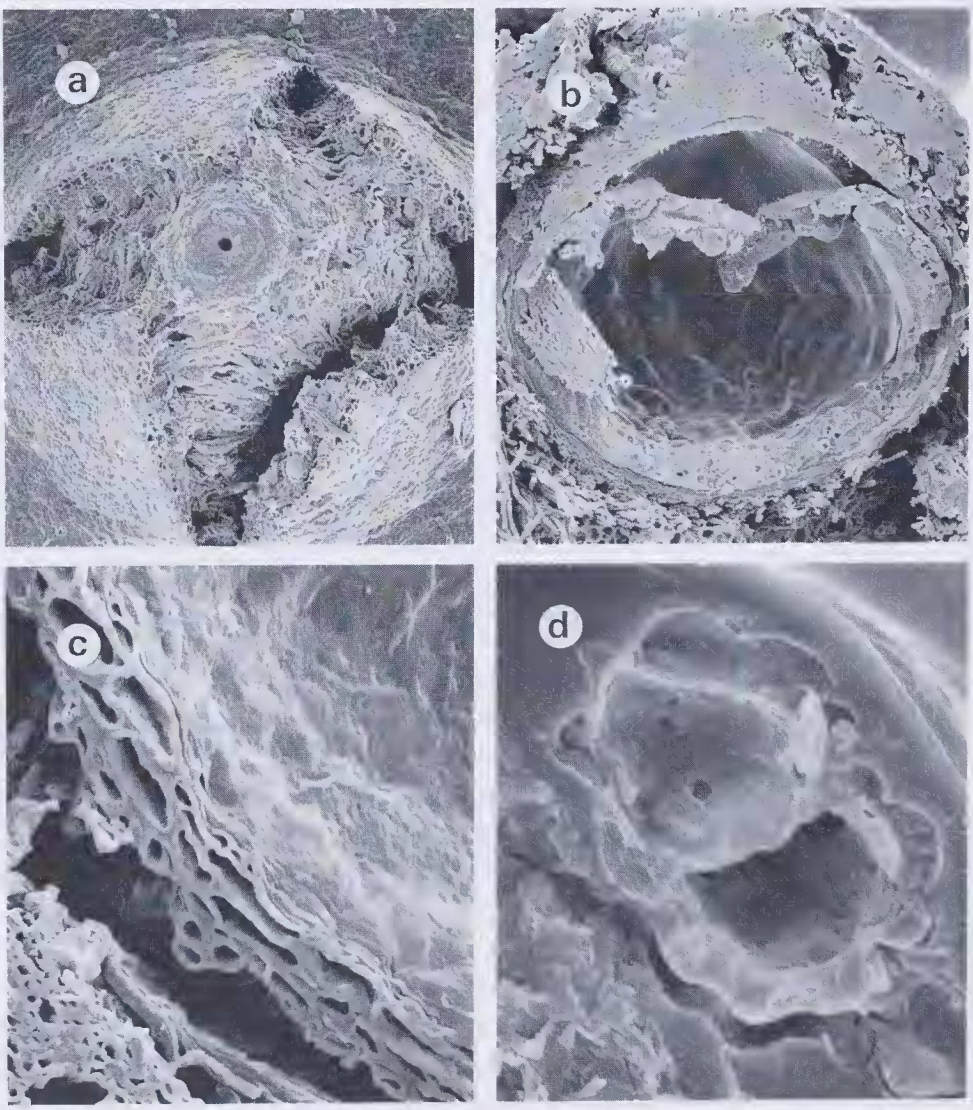

Fig. 1. *Pronectria streimannii*. a - ascomata on the host thalli, x140. b - section of perithecium, x220. c - wall of perithecium, x1420. d - ascospore, x5000.

arise in convex galls; by the lack of persistent branched and anastomosing cellular pseudoparaphyses, and by the strongly cylindrical asci with monostichously arranged ascospores, which remain in these lines after release from the asci. In contrast, the asci of *P. jamesii* are elongate, with more or less distichously arranged ascospores.

Another somewhat similar species is *Polycoccum bryonthae* (Arnold) Vězda which differs in having ascomata which are erumpent from the apothecia of the host (rather than from the host thallus), much smaller perithecia [70-100(-150) µm], and in having persistent, branched and anastomosing cellular pseudoparaphyses. The ascospores of *P. bryonthae* also differ, being only slightly verruculose and narrower [(10-)11-13(-15) x (4-)4.5-6 µm] than those of *Pronectria streimannii*. The substrate of the two taxa also differs, with *Polycoccum bryonthae* occuring on *Caloplaca* and *Pertusaria* species.

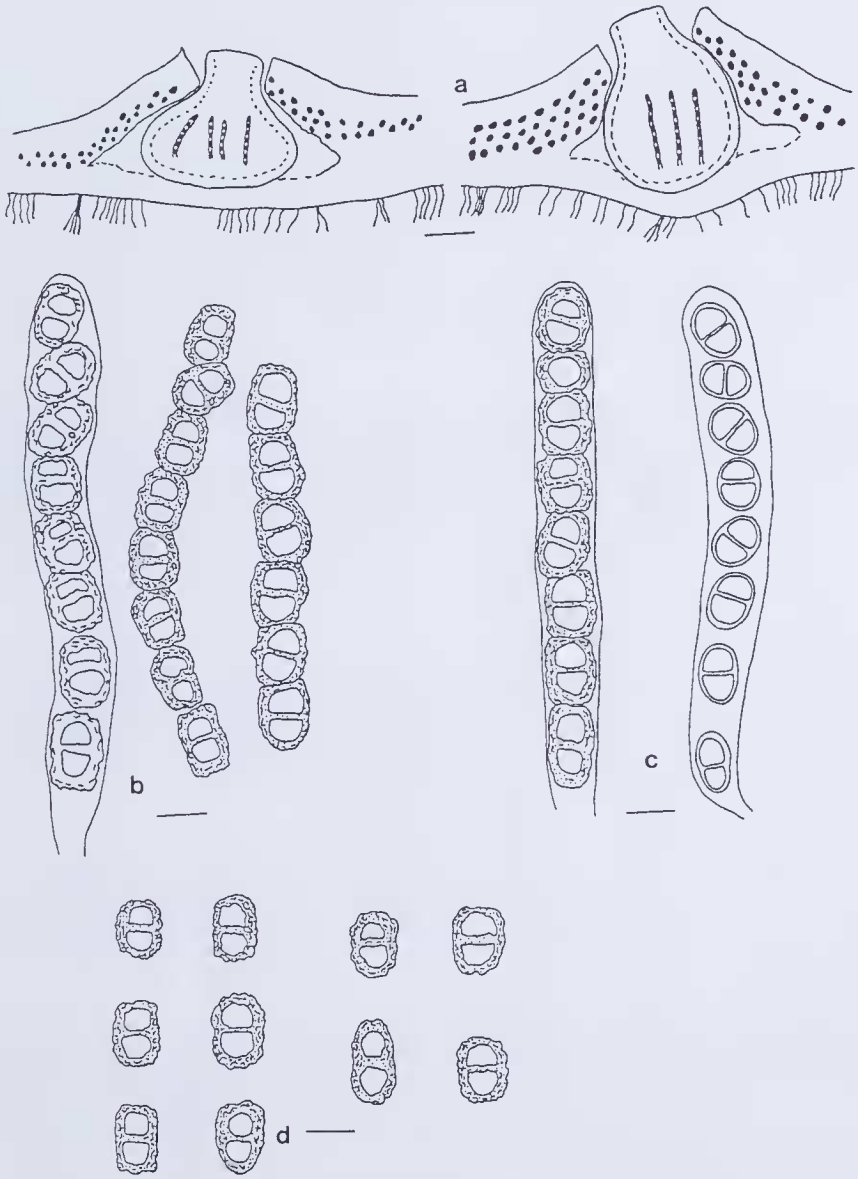

Fig. 2. *Pronectria streimannii*. a - section of perithecium, scale 70 mm. b - ascus and ascospores after release from the asci, scale 7 mm. c - asci, scale 7 mm. d - ascospores, scale 7 mm.

2. *Vouauxiomyces brattii* Kondratyuk *sp. nov.*

Fungus lichenicola. Conidiomata pycnidiformia, semi-immersa vel erumpia, aggregata, 56-330 µm in diam., in gallis immersa, muris textura angulari. Cellulae conidiogenae ampuliformes vel lageniformes, hyalinae, 8.0-10.0(-14.5) x 3.0-4.0 µm. Conidia holoblastica, clavata vel pyriformia, hyalina, simplicia, apicibus rotundatis et basi truncatis, (12-)13.5-16.5(-17.5) x (4.0-)4.5-5.5 µm.

TYPUS: Tasmania: 'Fern Bower' Sth of Maydena. On *Pseudocyphellaria faveolata* (Delise) Malmc. [no date], *G.C. Bratt, M.H. Bratt & WST* (HO 34317).

Lichenicolous fungus, parasymbiotic on the thallus of *Pseudocyphellaria faveolata*, producing black conidiomata occuring on wart- or gall-like deformations of the host thalli. *Conidiomata* pycnidial, immersed at first but becoming erumpent through the surface of the host, mainly aggregated in groups in blackish stromatic tissues of warts or gall-like deformations (0.6-1.0 mm diam. and 0.4-0.5 mm high) of the host thalli, black, 56-330 µm diam. and 28-111 µm high; wall of mainly 6-8 cell layers, 11.2-16.8 µm thick, dark brown, pseudoparenchymatous (textura angularis), cells thick-walled, 3-4 µm diam. *Conidiogenous cells* holoblastic, ampulliform to lageniform, lining the pycnidial cavity, percurrently proliferating, annellate with to 3-(4?) annellations, hyaline, smooth-walled, 8.0-10.0(-14.5) x 3.0-4.0 µm. *Conidia* arising singly, obpyriform, often rather irregular in shape, hyaline, collecting in a macilaginous mass in the pycnidial cavity, simple, apex rounded, the base conspicuously truncated, thin-walled, smooth-walled (12-)13.5-16.5(-17.5) x (4.0-)4.5-5 µm. (Fig. 3 a-b)

NOTES
Vouauxiomyces brattii differs from the other species of *Vouauxiomyces* in having much bigger conidia; in contrast, these are 3-5(-6) x 2-3.5(-4) µm in *V. ramalinae* (Nordin) D.Hawksw. and (7-)7.5-10.5(-11.5) x (5-)5.5-7(-7.5) µm in *V. santessonii* D.Hawksw. (all data according to Hawksworth 1981), and 4.5-5.5(-6) x 2.5-3.5 µm in *V. granulatae* Wedin (Wedin 1994) occuring on *Pseudocyphellaria granulata* from Argentina. *Vouauxiomyces* species are anamorphs of *Abrothallus*, but no such anamorph was present among the material of *V. brattii.*

3. *Weutiomyces tatjanae* Kondratyuk *sp. nov.*

Fungus lichenicola. Ascomata superficialia, uniloculata, dispersa, singularia, nigra, globosa, ostiolata, setosa, (80-)120-280 µm diam; setae atrobrunneae, simplices, rectae vel leviter arcuatae, leaves, 18-36 x 2.5-5.5 µm; muris 6-12 µm crassis, e 3-4 stratis cellularum et pseudoparenchymaticarum constantes. Paraphyses desunt. Asci cylindrici, bitunicati, (40-)54-63 x 5.5-6.5(-7.0) µm, 8-spori. Ascosporae ellipsoideae, 1-septatae, hyalinae, laeves, 6.0-11.0(-12.0) x (1.5-)2.0-3.5(4.0) µm.

TYPUS: Tasmania: Florentine Valley, by track 7, about 55 miles [88 km] WNW of Hobart, in high forest of *Nothofagus cunninghamii* in moderate shade with numerous mosses, growing on fallen logs, on *Pseudocyphellaria coronata* (Müll. Arg.) Malme thalli, 13 Dec. 1952, *R .Melville with J.H. Willis, W.M. Curtis & D. Paton 2339* (HOLOTYPUS: BM).

Lichenicolous fungus, parasymbiotic on *Pseudocyphellaria* and *Lobaria* thalli and apothecia, forming black setose ascomata. *Ascomata* superficial, uniloculate, perithecioid, scattered, arising singly or rarely in groups of 2-3(-7), black, globose and very often collapsed, ostiolate, setose mainly on whole surface of peritecia or particularly around the ostiole, (80-)120-280 µm diameter. *Setae* numerous (20 and more), dark brown, simple, straight or slightly arcuate, smooth-walled, thick-walled, 18-36 x 2.5-5.5; walls 6-12 µm thick, pseudoparenchymatous, composed of 3-4 layers of cells, brown-blackish, K+ greenish. *Paraphyses* absent. *Asci* very numerous, arising in a

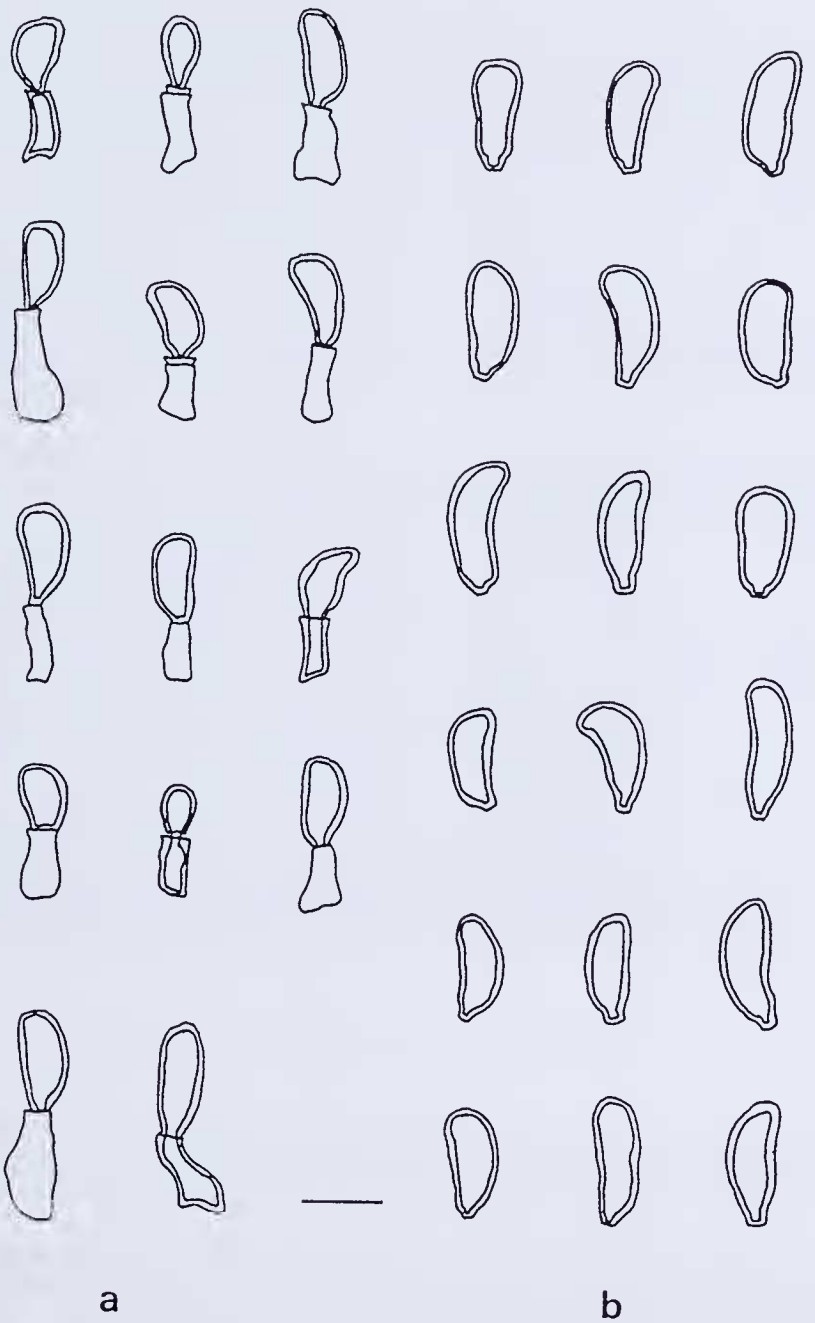

Fig. 3 *Vouauxiomyces brattii*. a - conidiogenous cells, scale 7 mm. b - conidia, scale 7 mm.

fascicle from the base of the perithecial cavity, narrowly cylindrical to cylindrical, with 8 ascospores arranged in 1(-2) lines, (40-)54-63 x 5.5-6.5(-7) µm. *Ascospores* ellipsoid, 1-septate, slightly constricted at the septa, the cells sometimes rather unequale in size, hyaline, smooth-walled, 0-4 guttulate, 6.0-11.0(-12.0) x (1.5-)2.0-3.5(-4.0) µm. (Fig. 4 a-d, 5 a-c, 6 a-b)

NOTES

The new species differs from *Wentiomyces peltigericola* D.Hawksw. (Hawksworth 1980) in having much larger perithecia (80-125 µm in *W. peltigericola*), smaller ascospores (12-16 x 3.5-4.5 µm in *W. peltigericola*), and in having different hosts, *W. peltigericola* occurring on species of *Peltigera aphthosa* group.

Both *Wentiomyces tatjanae* and *W. peltigericola* show some superficial similarity to *Niesslia cladoniicola* D.Hawksw. & W.Gams (Hawksworth 1975), a species which grows on aged *Cladonia rangiformis* Hoffm. podetia. However, *N. cladoniicola* differs from the new species by having a much thicker perithecium wall consisting 4-6(-8) layers of cells, having persistent paraphyses and unitunicate asci, and much narrower ascospores (4.5-8 x 1.5-2 µm).

ADDITIONAL SPECIMENS EXAMINED

NEW ZEALAND: On *Pseudoeyphellaria coronata* (Müll.Arg.) Malme thalli, 1843-1844, *W. Stephenson* 40 (BM ex Herb. R.J. Shuttleworth).

PAPUA NEW GUINEA: Southern Highlands: Munia Logging Area, 14 km NW of Jalibu, 2300 m alt., *Nothofagus* and *Podocarpaceae* dominated forest, on fallen, dead tree branch, on *Sticta* cf. *boschiana* thalli and apothecia, 8 Sep. 1982, *H. Streimann* 23329 (CBG).

4. *Zwackhiomyces kantvilasii* Kondratyuk *sp. nov.*

Fungus lichenicola. Ascomata globosa vel irregulariter globosa, 140-180 µm in diam., dispersa, thallo vegetativo hospitis insidentia, semiimmersa vel superficialia, atra. Peridium in sectione longitudinali c. 18-27(-36) µm crassum, castaneum. Hamathecium paraphysoideis, 1.0-1.5 µm diam. Asci cylindrici (40-)54-72(-80) x -10(-11) µm, 4-spori. Ascosporae hyaline, parietibus distincte verrucose punctatis, 14.5-18.0 x 3.5-4.0(-5.5) µm, 1-septate, 4 -guttulatae.

TYPUS: Tasmania: Tinderbox (near Hobart), alt. sea level, on *Parmotrema chinense* (Osbeck) Hale & Ahti on dolerite in open dry sclerophyll forest, 20 July 1980, *G. Kantvilas* 277/80 (HOLOTYPUS: BM).

Fungus lichenicolous, parasymbiotic on *Parmotrema chinense* thalli forming scattered, globose, black ascomata. *Ascomata* pseudoperithecia, globosa or irregular globosa, scattered, semi-immersed in the beginning, then superficial or immersed in host thallus only at the base, black, 140-180(-200) µm in diam. *Walls* in longitudinal section 18-27(-36) µm thick, blackish brown or dark brown at the base. *Hamathecium* paraphysoids persistent, branched, hyaline, 1.0-1.5 µm diam. *Asci* cylindrical to narrowly cylindrical, (40)54-72(-80) x 8-10(-11) µm, 4-spored. *Ascospores* hyaline, smooth or distinctly verrucose at maturity, 1-septate, 4-guttulate, 14.5-18.0 x 3.5-4.0(-5.5) µm. (Fig. 6 d, 7 a-d, 8 a-b)

NOTES

The new species is most closely related to *Zwackhiomyces euplocinus* Haf., Grube & R.S.Egan and to *Z. sphinctrinoides* (Zwackh) Grube & Haf. (see Grube & Hafellner 1990 for descriptions). *Z. euplocinus* differs in having 6-8-spored asci, 46-60(-65) x 12-14 µm, much wider ascospores (14-18 x 4-6 µm), and by occurring on *Speerschneidera euploca*.

Z. sphinctrinoides differs from *Z. kantvilasii* by its larger perithecia (200-240 µm in diam.), 8-spored asci, 75-85 x 12-14 µm, much longer and wider ascospores [(15-) 15.5-23 x (4-)4.5-6.5(-8.5) µm], and by occurring on '*Lecidea' lurida*.

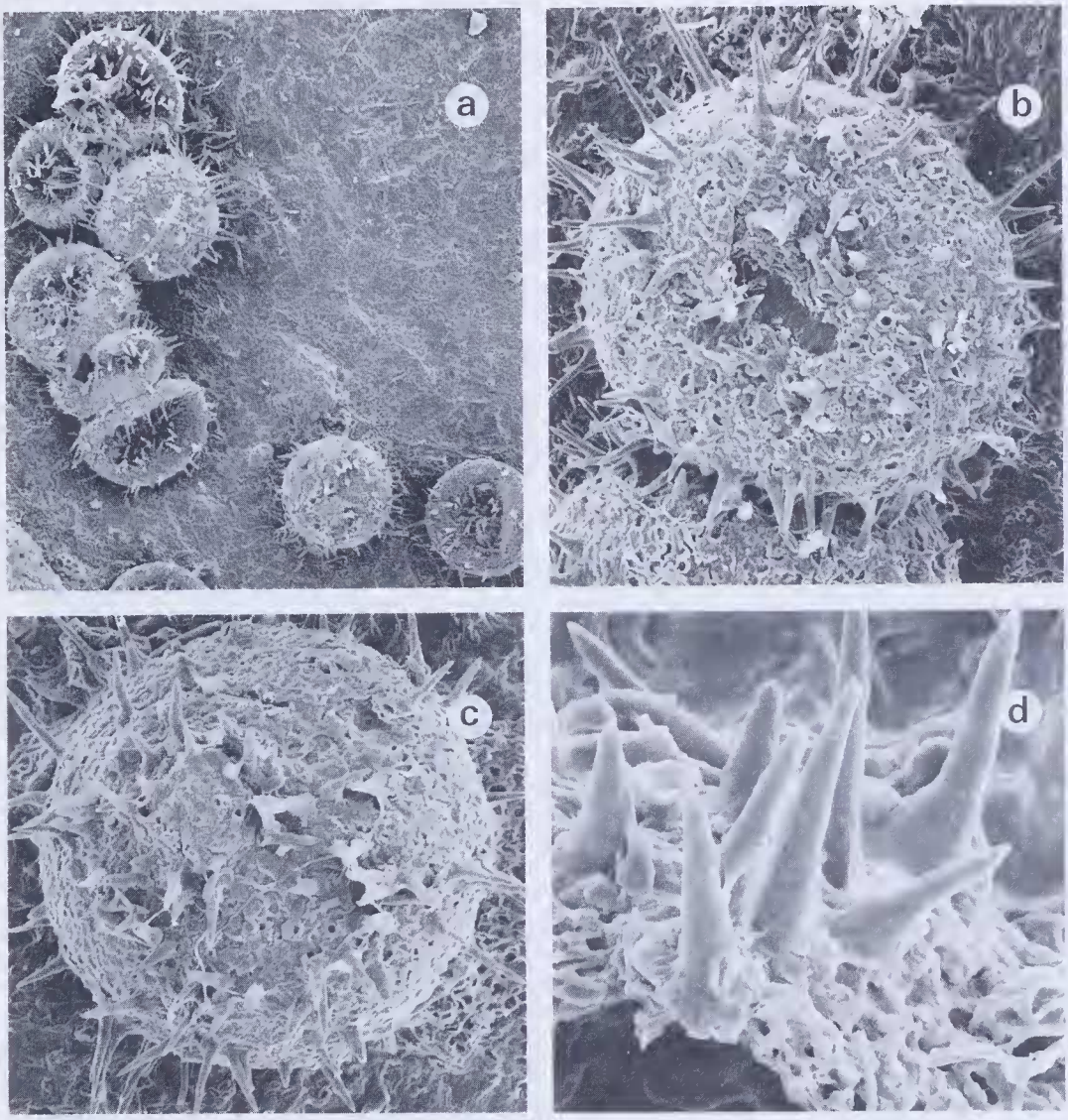

Fig. 4. *Wentiomyces tatjanae*. a - ascomata on the host thalli, x85. b and c - setose perithecium, x355. d - setae, x1420.

ADDITIONAL SPECIMEN EXAMINED

TASMANIA: Notley Gorge, on shaded myrtle at 086 C8/1, 250 feet [c. 76 m]. alt., on *Parmotrema chenense*, 2 Jun. 1963, *G.C. Bratt 110* (BM).

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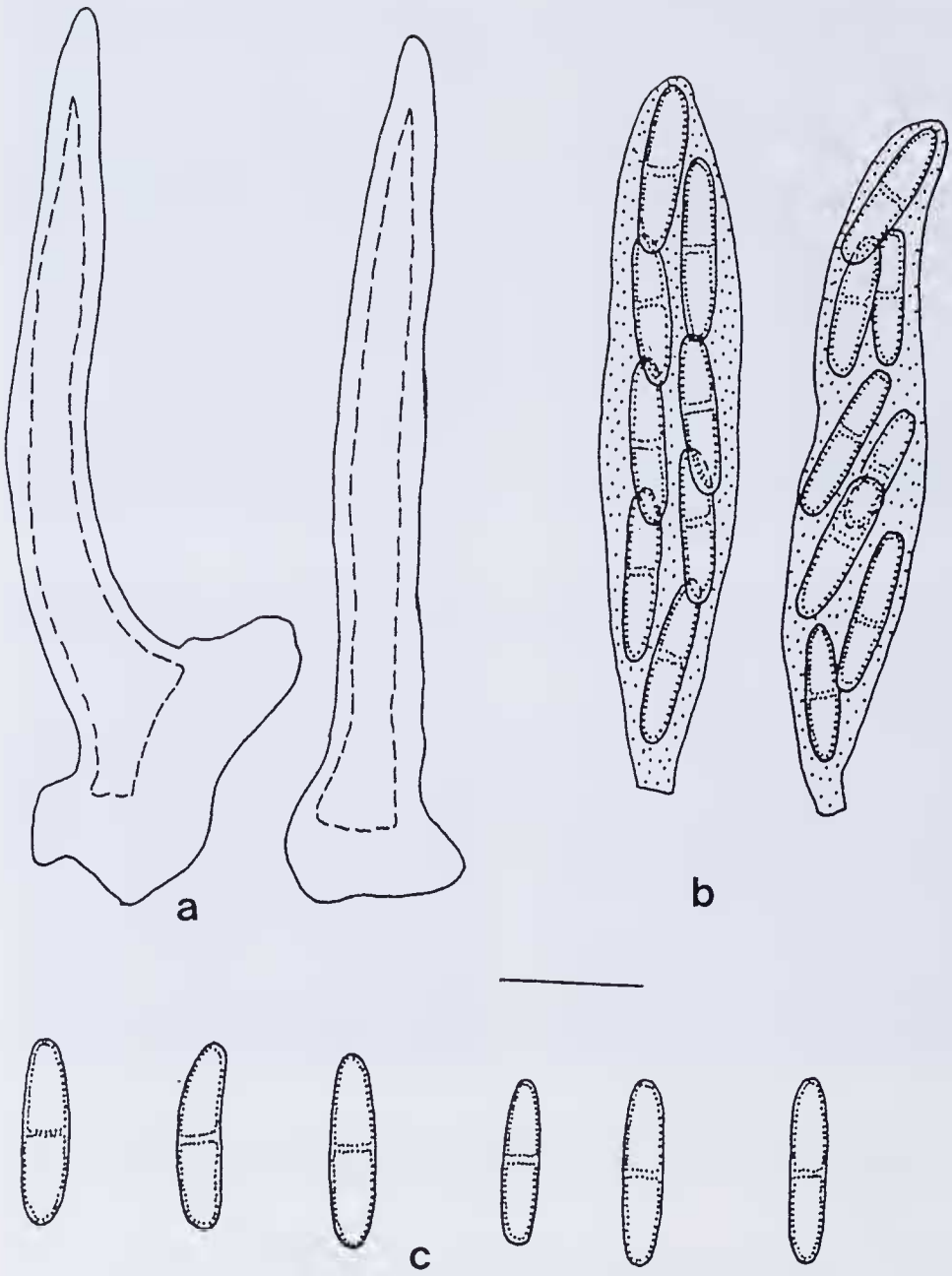

Fig. 5. *Wentiomyces tatjanae*. a - setae, scale 7 mm. b - asci, scale 7 mm. c - ascospores, scalc 7mm.

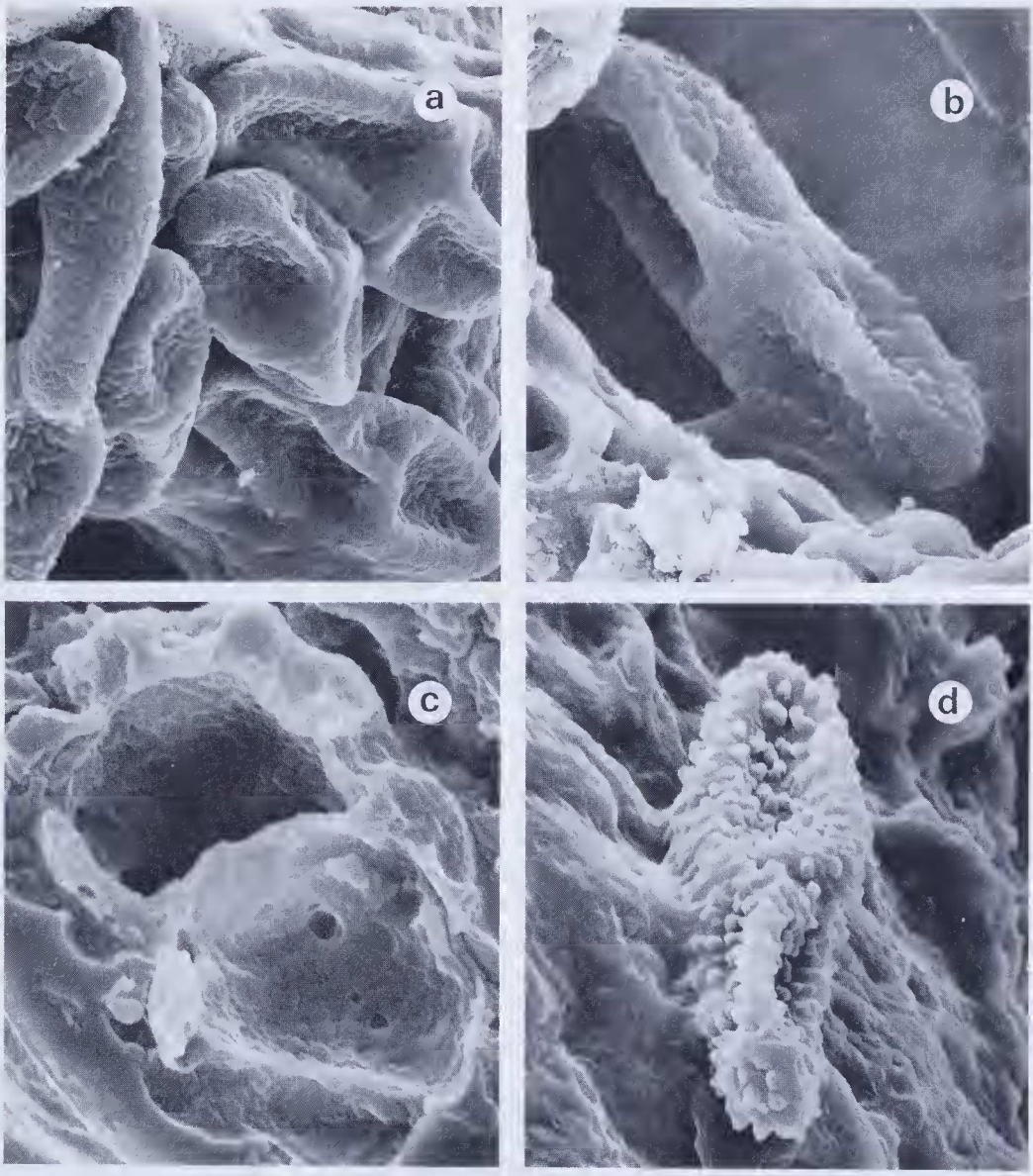

Fig. 6. *Wentiomyces tatjanae*. a - ascospores, x3550. b. - ascospores, x7100. *Pronectria streimannii*. c - ascospores x7100. *Zwackhiomyces kantvilasii*. d - ascospores x5000.

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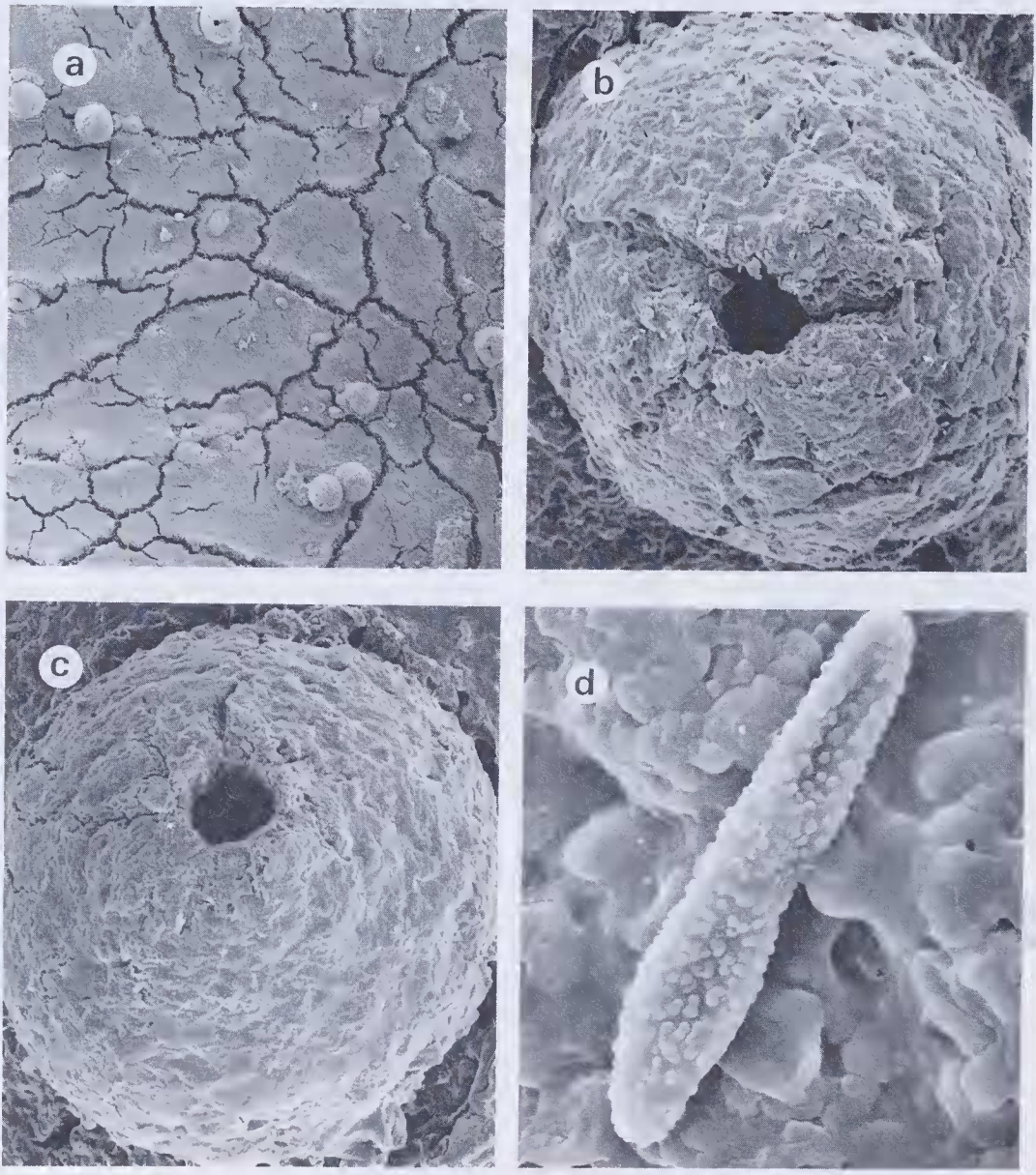

Fig. 7. *Zwackhiomyces kantvilasii*. a - ascomata on the host thalli, x35. b - ascomata on the host talli, x500. c - perithecium, x500. d - ascospores, x5000.

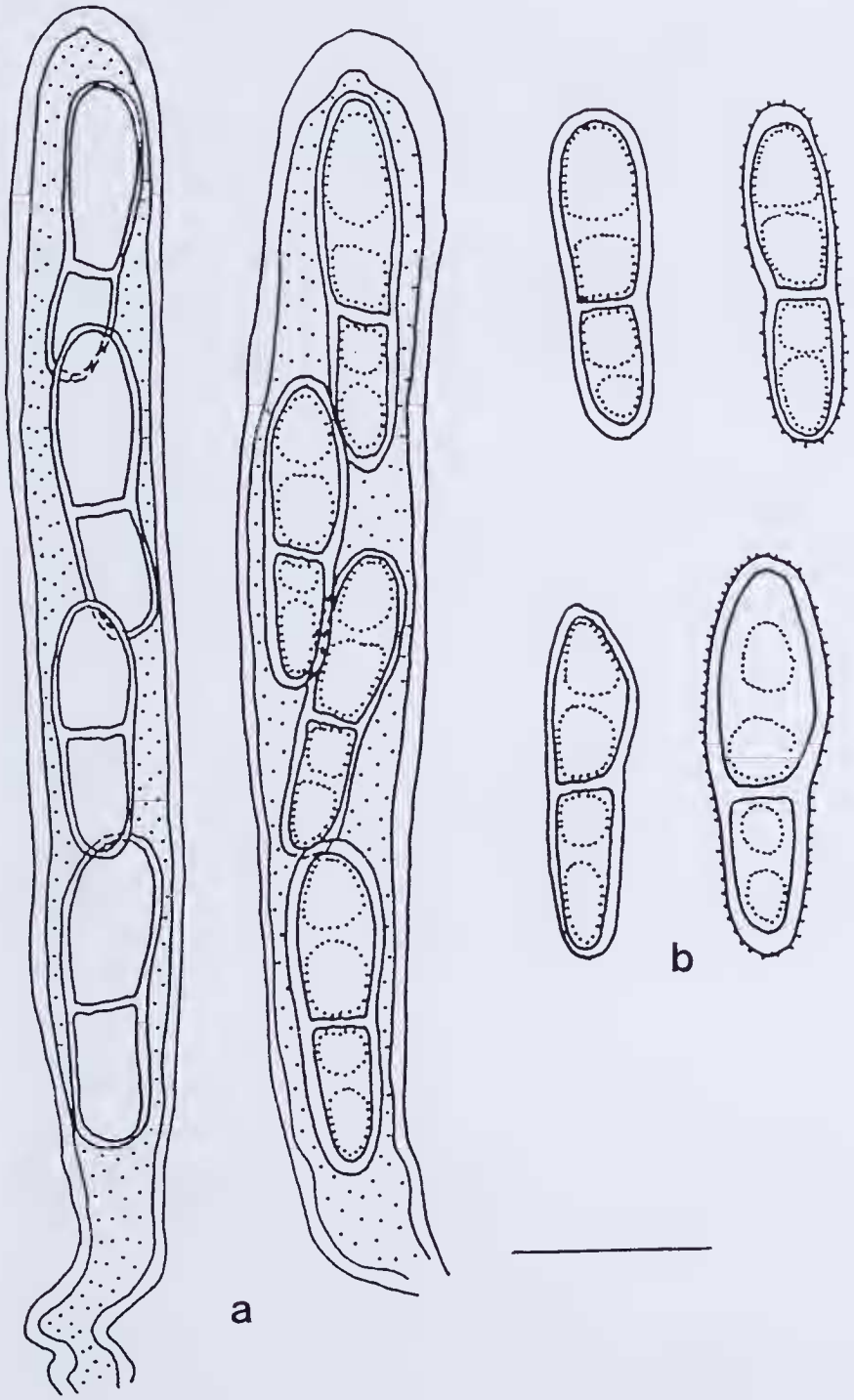

Fig. 8. *Zwackhiomyces kantvilasii*. a - asci, scale = 7 mm. b - ascospores, scale 7mm.

Rererences

Coppins, B.J. & Kondratyuk S.Y. (1995). *Stigiomyces* and *Pseudonitschkia*: two new genera of lichenicolous fungi. *Edinburgh Journal of Botany* 52 (2): 229-236.

Grube, M. & Hafellner, J. (1990). Studien an flechtenbewohnenden Pilzen der Sammelgattung *Didymella* (*Ascomycetes, Dothideales*). *Nova Hedwigia* 51 (3-4): 283-360.

Hawksworth, D.L. (1975). Notes on British lichenicolous fungi, I. *Kew Bulletin.* 30: 183-203.

Hawksworth, D.L. (1980). Notes on some fungi occuring on *Peltigera*, with a key to accepted species. *Transactions of the British Mycological Society* 74 (2): 363-386.

Hawksworth, D.L. (1981). The lichenicolous *Coelomycetes*. *Bulletin British Museum (Natural History) Botany series* 9: 1-98.

Hawksworth, D.L. (1982 [1983]). A new species of *Nectriella* with ornamented spores from Iceland, with a key to the lichenicolous species. *Nova Hedwigia* 35: 755-762.

Hawksworth, D.L. & Diederich, P. (1988). A synopsis of the genus *Polycoccum* (*Dothideales*), with a key to accepted species. *Transactions of the British Mycological Society* 90: 293-312.

Kondratyuk, S.J. & Galloway, D.J. (1995). Lichenicolous fungi and chemical patterns in *Pseudocyphellaria*. *Bibliotheca Lichenologica* 57:327-345.

Kondratyuk, S.Y., Galloway, D.J. & Hawksworth, D.L. (1994). *Unguiculariopsis ahtii*, and some other new lichenicolous fungi from *Pseudocyphellaria*. *Acta Botanica Fennica* 150: 93-97.

Wedin, M. (1994). New and noteworthy lichenicolous fungi from southermost South America. *Lichenologist* 26: 301-310.

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